Inorganic content in hazelnut: an important marker for quality and authentication

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Agnese Giacomino, Paolo Inaudi, Ornella Abollino, Silvia Berto, Chiara Cordero, Erica Liberto, Mery Malandrino

Thanks to the diffusion of the concept of “healthy foods”, we have assisted to a growing interest toward nuts fruit. The present work take part to a wide project based on comprehensive untargeted studies focused to obtain a chemical food fingerprint of hazelnuts and their semi- and finished products, with particular interest on those compositional characteristics whose significance are mainly related to nutritional properties, botanical and geographical origin, technological impact and sensory quality. In addition, the advantages deriving from new markers profiling will be especially evaluated in view of the possible implementation of rapid methods and screening procedures for routine sample authentication and quality assessment. Markers with a relevant informative content (in terms of differentiation and qualification) will be adopted as Analytical Decision Makers.

Hazelnuts contain abundant amounts of biologically active compounds such as antioxidants, fiber components, and several nutrients: carbohydrates, fats, minerals and vitamins. In this study, we focused our attention on the inorganic elements. The concentration and the distribution of these nutrients in vegetal foods depend on a number of variables, such as climate, soil characteristics, transportation, storage, transformation and it can be used for geographical assessment.

A complete inorganic profile has been obtained from two set of experiments:

1. The shell of hazelnuts, from two different cultivars monitored during growth, were analysed to evaluate the quali-quantitative distribution of the essential micronutrients as a consequence of the soil/plant interaction. The nutrients content could be naturally unaffected by exogenous surface contamination originating from airborne aerosols and soil dusts.
2. The nutrients distributions during the whole product life (from raw nuts to food-end products) were evaluated and their dependence on the species, origin, post harvest treatments and storage processes was investigated.

We have quantified the presence of diagnostic inorganic elements even at trace levels using Inductively Coupled Plasma Optical Emission Spectroscopy.

Multivariate chemometric analysis applied on the analytical results highlighted similarities or dissimilarities among samples and correlations among the different considered nutrients, soil, origin and processing.

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